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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
09 729,859	12 06 2000	Kenji Takahashi	Q62064	7878

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EXAMINER

YUN, JURIE

ART UNIT PAPER NUMBER

2882

DATE MAILED 04 23 2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/729,859

Applicant(s)

TAKAHASHI, KENJI

Examiner

Jurie Yun

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 06 December 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1 ☒ Certified copies of the priority documents have been received.
- 2 ☐ Certified copies of the priority documents have been received in Application No. _____.
- 3 ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Cupolo, III (USPN 5,666,174).

3. With respect to claims 1 and 15, Cupolo, III discloses a display apparatus (30) comprising: a light source unit (Fig. 4, 31) for generating excitation light having a predetermined wavelength; an optical element (67) for modulating the excitation light generated by the light source unit for each of pixels in a two-dimensional plane; and a fluorescent screen (56) for receiving the excitation light modulated by the optical element at a first surface and emitting visible light from a second surface opposite to the first surface, said fluorescent screen including a layer of phosphor having an absorption coefficient not smaller than $1 \times 10^2 \text{ cm}^{-1}$ for the excitation light. Cupolo, III also discloses the phosphor includes at least one of the phosphors listed (column 6, lines 50-60). Although the absorption coefficient of the phosphor layer is not specifically disclosed, it is inherent that it has an absorption coefficient not smaller than $1 \times 10^2 \text{ cm}^{-1}$ for the excitation light since some of the same phosphors are disclosed.

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Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 3, 8, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cupolo, III (USPN 5,666,174) and further in view of Janning (USPN 6,147,456).

6. With respect to claims 2, 3, 8, 11 and 13, Cupolo, III discloses a display apparatus (30) comprising: a light source unit (Fig. 4, 31) for generating excitation light having a predetermined wavelength; an optical element (67) for modulating the excitation light generated by the light source unit for each of pixels in a two-dimensional plane; and a fluorescent screen (56) for receiving the excitation light modulated by the optical element at a first surface and emitting visible light from a second surface opposite to the first surface, said fluorescent screen including a layer of phosphor.

Cupolo, III does not disclose: a thickness of the layer of phosphor that gives a maximum brightness caused by the excitation light is not larger than 80 μm ; a product of an absorption coefficient for the excitation light and a thickness of the layer of phosphor is within a range from 2 to 4.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Cupolo, III invention and disclose a thickness of the layer of phosphor that gives a maximum brightness caused by the excitation light is

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not larger than 80 μm , since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. For example, Janning discloses (column 9, lines 25-30) a light emitting layer having a thickness of 1200 Angstroms, which is not larger than 80 μm . It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Cupolo, III invention and disclose the thickness of the layer of phosphor that gives a maximum brightness caused by the excitation light is not larger than 80 μm . The thickness of the phosphor layer giving a maximum brightness caused by the excitation light will depend on the phosphor(s) used, and can be found through experimentation.

It would also have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Cupolo, III invention and disclose a product of the absorption coefficient for the excitation light and a thickness of the layer of phosphor is within a range from 2 to 4. This would follow after experimentation to discover the optimum thickness of the phosphor layer.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cupolo, III (USPN 5,666,174) and further in view of Davey (USPN 6,104,456).

8. With respect to claim 4, Cupolo, III discloses a display apparatus (30) comprising: a light source unit (Fig. 4, 31) for generating excitation light having a predetermined wavelength; an optical element (67) for modulating the excitation light generated by the light source unit for each of pixels in a two-dimensional plane; and a fluorescent screen (56) for receiving the excitation light modulated by the optical

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element at a first surface and emitting visible light from a second surface opposite to the first surface, said fluorescent screen including a layer of phosphor having an absorption coefficient not smaller than $1 \times 10^2 \text{ cm}^{-1}$ for the excitation light (see claim 1 rejection above).

Cupolo, III does not disclose a projection lens to project the excitation light modulated by the optical element.

However, the use of a projection lens to project light is well known in the art. For example, Davey discloses the use of a projection lens (3). Although the projection lens is located to project the excitation light to the optical element, it would have been obvious to also or instead place the projection lens between the optical element and the fluorescent screen. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Cupolo, III invention and disclose a projection lens to project the excitation light modulated by the optical element; this would facilitate light transmission to the fluorescent screen.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cupolo, III (USPN 5,666,174) as applied to claim 1 above, and further in view of Janning (USPN 6,147,456).

10. With respect to claim 7, Cupolo, III does not disclose a thickness of the layer of phosphor is not larger than $120 \text{ }\mu\text{m}$. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Cupolo, III invention and disclose a thickness of the layer of phosphor is not larger than $120 \text{ }\mu\text{m}$, since it has been held that where the general conditions of the claim are disclosed in the

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prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. For example, Janning discloses (column 9, lines 25-30) a light emitting layer having a thickness of 1200 Angstroms, which is not larger than 120 μm . It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Cupolo, III invention and disclose a thickness of the layer of phosphor is not larger than 120 μm . The thickness of the phosphor layer giving a maximum brightness caused by the excitation light will depend on the phosphor(s) used, and can be found through experimentation.

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cupolo, III (USPN 5,666,174) and Davey (USPN 6,104,456) as applied to claim 4 above, and further in view of Janning (USPN 6,147,456).

12. With respect to claim 9, Cupolo, III and Davey do not disclose a thickness of the layer of phosphor is not larger than 120 μm . However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the Cupolo, III invention and disclose a thickness of the layer of phosphor is not larger than 120 μm , since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. For example, Janning discloses (column 9, lines 25-30) a light emitting layer having a thickness of 1200 Angstroms, which is not larger than 120 μm . It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the Cupolo, III invention and disclose a thickness of the layer of phosphor is not larger than 120 μm . The thickness

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of the phosphor layer giving a maximum brightness caused by the excitation light will depend on the phosphor(s) used, and can be found through experimentation.

13. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cupolo, III (USPN 5,666,174) as applied to claim 1 above, and further in view of Duggal et al. (USPN 6,357,889 B1).

14. With respect to claims 17 and 19, Cupolo, III does not disclose the fluorescent screen further includes second phosphor which is different from said phosphor and generates visible light upon receiving luminescent light from said phosphor; wherein said second phosphor includes at least one of $\text{Y}_3\text{Al}_5\text{O}_{12}:\text{Ce}$ and $\text{Y}_3(\text{Al}, \text{Ga})_5\text{O}_{12}:\text{Ce}$. Duggal et al. disclose this (claim 7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Cupolo, III invention and disclose the fluorescent screen further includes second phosphor which is different from said phosphor and generates visible light upon receiving luminescent light from said phosphor; wherein said second phosphor includes at least one of $\text{Y}_3\text{Al}_5\text{O}_{12}:\text{Ce}$ and $\text{Y}_3(\text{Al}, \text{Ga})_5\text{O}_{12}:\text{Ce}$, as taught by Duggal et al. As disclosed by Duggal et al. (column 2, lines 29-37), "One advantage of the present invention is the provision of a light source which is tunable to more than one color for mood or for functional purposes. Another advantage of the present invention is that the light emitted by the light source is indefinitely variable over a range of wavelengths. Another advantage of the present invention is that it enables the light source to be adjusted to an optimum color for performing a particular activity."

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15. Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cupolo, III (USPN 5,666,174) and Davey (USPN 6,104,456) as applied to claim 4 above, and further in view of Duggal et al. (USPN 6,357,889 B1).

16. With respect to claims 18 and 20, Cupolo, III and Davey do not disclose the fluorescent screen further includes second phosphor which is different from said phosphor and generates visible light upon receiving luminescent light from said phosphor; wherein said second phosphor includes at least one of $Y_3Al_5O_{12}:Ce$ and $Y_3(Al, Ga)_5O_{12}:Ce$. Duggal et al. disclose this (claim 7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the Cupolo, III invention and disclose the fluorescent screen further includes second phosphor which is different from said phosphor and generates visible light upon receiving luminescent light from said phosphor; wherein said second phosphor includes at least one of $Y_3Al_5O_{12}:Ce$ and $Y_3(Al, Ga)_5O_{12}:Ce$, as taught by Duggal et al. As disclosed by Duggal et al. (column 2, lines 29-37), "One advantage of the present invention is the provision of a light source which is tunable to more than one color for mood or for functional purposes. Another advantage of the present invention is that the light emitted by the light source is indefinitely variable over a range of wavelengths. Another advantage of the present invention is that it enables the light source to be adjusted to an optimum color for performing a particular activity."

17. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cupolo, III (USPN 5,666,174) and further in view of Janning (USPN 6,147,456) and Davey (USPN 6,104,456).

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18. With respect to claims 5 and 12, Cupolo, III discloses all the elements except for the use of a projection lens to project the excitation light modulated by the optical element, and the thickness of the layer of phosphor that gives a maximum brightness caused by the excitation light is not larger than 80 μm .

The use of a projection lens to project light is well known in the art. For example, Davey discloses the use of a projection lens (3). Although the projection lens is located to project the excitation light to the optical element, it would have been obvious to also or instead place the projection lens between the optical element and the fluorescent screen. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Cupolo, III invention and disclose a projection lens to project the excitation light modulated by the optical element; this would facilitate light transmission to the fluorescent screen.

As to the thickness of the layer of phosphor that gives a maximum brightness caused by the excitation light, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. For example, Janning discloses (column 9, lines 25-30) a light emitting layer having a thickness of 1200 Angstroms, which is not larger than 80 μm . It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the Cupolo, III invention and disclose the thickness of the layer of phosphor that gives a maximum brightness caused by the excitation light is not larger than 80 μm . The thickness of the phosphor layer

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giving a maximum brightness caused by the excitation light will depend on the phosphor(s) used, and can be found through experimentation.

19. Claims 6, 10, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cupolo, III (USPN 5,666,174) and further in view of Davey (USPN 6,104,456) and Janning (USPN 6,147,456).

20. With respect to claims 6, 10 and 14, Cupolo, III discloses all the elements except for the use of a projection lens to project the excitation light modulated by the optical element; a product of an absorption coefficient for the excitation light and a thickness of the layer of phosphor is within a range from 2 to 4; and the thickness of the layer of phosphor is not larger than 120 μm .

The use of a projection lens to project light is well known in the art. For example, Davey discloses the use of a projection lens (3). Although the projection lens is located to project the excitation light to the optical element, it would have been obvious to also or instead place the projection lens between the optical element and the fluorescent screen. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Cupolo, III invention and disclose a projection lens to project the excitation light modulated by the optical element; this would facilitate light transmission to the fluorescent screen.

As to the thickness of the layer of phosphor and the product of the absorption coefficient for the excitation light and thickness of the phosphor layer, it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105

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USPQ 233. For example, Janning discloses (column 9, lines 25-30) a light emitting layer having a thickness of 1200 Angstroms, which is not larger than 120 μm . It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the Cupolo, III invention and disclose the thickness of the layer of phosphor is not larger than 120 μm . The thickness of the phosphor layer giving a maximum brightness caused by the excitation light will depend on the phosphor(s) used, and can be found through experimentation.

It would also have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Cupolo, III invention and disclose a product of the absorption coefficient for the excitation light and a thickness of the layer of phosphor is within a range from 2 to 4. This would follow after experimentation to discover the optimum thickness of the phosphor layer.

21. With respect to claim 16, Cupolo, III discloses the phosphor includes at least one of the phosphors listed (column 6, lines 50-60).

Conclusion

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kumar et al. (USPN 5,926,239) disclose backlights for color liquid crystal displays.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 703 308-3535.

The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 703 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703 308-7722 for regular communications and 703 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0956.

Jurie Yun
April 10, 2003

